

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of

Confirmation No.: 2143

Johan LINDSTRÖM et al.

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Examiner: Jue ZHANG

For: ENERGY STORAGE

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VIA EFS-WEB

Commissioner for Patents

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**REPLY BRIEF IN RESPONSE TO EXAMINER'S ANSWER UNDER 37 C.F.R. §41.41**

Sir:

This is a Reply Brief in response to the Examiner's Answer dated December 24, 2008.

Specifically, in the present Reply Brief, Applicants reply to the "Examiner" Response to Applicant's Argument in the previous Advisory Action" section and the "Response to Argument" section of the Examiner's Answer.

The Examiner has repeated his position that element 302 in Fig. 31 of Rouillard is a DC-DC converter and reprints the annotated version of Fig. 31 previously provided in the Advisory Action at page 8 of the Examiner's Answer. The Examiner further refers to Fig. 35 of Rouillard as allegedly disclosing that the DC-to-DC converter is "operable to control the respective voltage fraction to vary the respective voltage fraction over a time period within a voltage interval around the respective nominal module voltage of each electrical storage module such that during the time period the respective voltage fraction supplied to each electrical storage module is set to be higher than the respective nominal module voltage of each electrical storage module," as is required by claim 1. This is incorrect.

As was noted in the Applicant's Appeal Brief, the modules 302 in Fig. 31 are not DC-to-DC converters. As was explained in Applicants' previous responses, the equalizers 302 monitor voltage across the individual cells and activate the bypass circuit 346 when appropriate to allow

the charging current to bypass the cell. That is, they allow for the bypass of the charging current around cells to prevent overcurrent in the cells. However, they are not converters themselves.

Further, even if the modulators were DC-to-DC converters, there is no disclosure of a DC-to-DC converter that is “coupled to the electric charge source” and that it is connected “to each of the electrical storage modules.” As is noted above, there does not appear to be any disclosure in Rouillard of a DC-to-DC converter, as required by claim 1, for example of the present application. However, even if the equalizer modules 302 of Rouillard were DC-to-DC converters, none of these modules is connected to a charge source and connected to each of the cells (CELL#1, CELL #2, CELL #N). While the first equalizer element 302 (EQUALIZER # 1) may be connected to “CELL #1” and may be partially connected to “CELL #2” it is not connected to the “CELL #N” as can be seen in Fig. 31 of Rouillard, for example.

Fig. 35 provides no further support to the Examiner’s position that the module 302 is a DC-to-DC converter. Fig. 35 of Rouillard merely shows a voltage waveform of a cell subjected to the equalization procedure disclosed therein. While the waveform changes as the transistor 342 is turned on and off to bypass the cells as desired, there is no disclosure in Rouillard of varying the voltage over a specific time period within a specific voltage interval, as is required by claim 1, for example, of the present application. The voltage waveform of Fig. 35 does not appear to vary over any particular defined voltage interval. Further, there is no defined time period at all, much less one in which the voltage is “set to be higher than the respective nominal module voltage of each electrical storage module,” as is also required by claim 1. As Applicant has previously noted, the modules 302 are used to control a charging current based purely on the voltage of the cells, there is no consideration of a time period at all. That is, the variations in the voltage waveform provided to the cell in Rouillard have nothing whatever to do with a particular voltage interval or a specific period of time.

The Examiner argues that with respect to Fig. 35, that Rouillard discloses that the DC-to-DC converter 302 controls the respective voltage fraction ( $V_{set}$ ) to vary the respective voltage fraction ( $V_{set} +/- VH_1$ ) over a period of time 6. This is incorrect. Again, as is noted above, the element 302 is not a converter and does not control the respective voltage fraction of each electrical module at all. As noted above, the elements 302 merely allow for the charging current to bypass modules or cells to prevent overcurrent. Further, Fig. 35 is described at Column 21, lines 40-50 of Rouillard. As set forth in Rouillard, the value  $V_{set}$  of Fig. 35 is the equalization

voltage set point at which equalization is initiated. No control is initiated until the voltage of the cell reaches +VH1 and then the transistor 342 is turned on and off to prevent overcurrent in the cell as noted above. The period 6 indicated in Fig. 35, which the Examiner alleges is the defined “time period” of claim 1 (See Examiner’s Answer, page 15), is of no particular length of time. That is, there is not indication in Rouillard that the reference numeral 6 in Fig. 35 refers to any particular period of time. Thus, Rouillard does not disclose a varying “the respective voltage fraction over a time period .. such that during the time period, the respective voltage fraction supplied to each electrical storage module is set to be higher than the respective nominal module voltage of each electrical storage module,” as required by claim 1, for example.

Accordingly, it is respectfully submitted that Rouillard does not disclose “a DC-to-DC converter coupled to the electric charge source and to each of the electrical storage modules, the DC-to-DC converter being operable to receive incoming power from the electric charge source and to supply a respective voltage fraction of the DC-system voltage to each electrical storage module wherein the DC-to-DC converter is further operable to control the respective voltage fraction to vary the respective voltage fraction over a time period within a voltage interval around the respective nominal module voltage of each electrical storage module such that during the time period the respective voltage fraction supplied to each electrical storage module is set to be higher than the respective nominal module voltage of each electrical storage module,” as is required by claim 1 of the present application.

Independent claim 10 of the present application relates to a method of charging a plurality of electrical storage modules including DC-to-DC converting the DC-system voltage into a respective voltage fraction per electrical storage module, supplying the respective voltage fraction to each electrical storage module and controlling the respective voltage fraction to vary over a time period within a voltage interval around a respective nominal module voltage of each electrical storage module such that the respective voltage fraction supplied to each electrical storage module within the time period is set to be higher than the respective nominal module voltage of each electrical storage module.

As is noted above, Rouillard does not disclose the DC-to-DC conversion of the present application. Rouillard also fails to disclose varying the respective voltage fraction over a time period within a voltage interval around a respective nominal module voltage of each electrical storage module such that the respective voltage fraction supplied to each electrical storage

module within the time period is set to be higher than the respective nominal module voltage of each electrical storage module as is required by the method of claim 10.

Thus, Rouillard fails to disclose all of the features of claim 10 of the present application.

Independent claim 19 recites an electrical energy storage system including "a DC-to-DC converter coupled to the electric charge source and to each of the electrical storage modules, the DC-to-DC converter being operable to: receive incoming power from the electric charge source; to supply a respective voltage fraction of the DC-system voltage to each electrical storage module" and "to vary each respective voltage fraction over a period of time within a voltage interval around the respective nominal module voltage of each electrical storage module such that within the period of time the respective voltage fraction supplied to each electrical storage module is set to be higher than the respective nominal module voltage of each electrical storage module." As is described above, Rouillard fails to disclose these features.

Thus, Rouillard fails to disclose all of the features of claim 19 of the present application.

The remaining claims depend from one of claims 1, 10 and 19, and thus, are believed to be patentable over Rouillard for at least the reasons described above.

In light of the above, it is respectfully submitted that claims 1-5, 7-14 and 17-20 of the present application are patentable over the cited art and are in condition for allowance.

No fee or extension of time is believed necessary for the submission of this Reply Brief, however, if any fee or extension is required, the Patent Office is authorized to charge the fee for the fee or extension to Deposit Account No. 15-0700.

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RCF/KJB

Respectfully submitted,



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